

APPENDIX E
RECLAMATION PLAN

RECLAMATION PLAN

E.1 INTRODUCTION

Reclamation refers to activities to restore areas disturbed by project construction to pre-construction conditions. The Reclamation Plan outlines the important elements of revegetation, soil stabilization, and range/wildlife habitat reclamation associated with the project. It defines goals/objectives, implementation components, restoration success criteria, and monitoring and maintenance components. It also identifies potential issues or constraints to reclamation, regulations and recommendations to ensure successful reclamation, and a summary of impacts and mitigation measures contained in various sections of this EIS applicable to reclamation. Other sections referenced here include Section 3.2 Soils, Section 3.4 Vegetation Resources, Section 3.5 Invasive, Non-Native Species, Section 3.6 Wildlife and Wildlife Habitat, Section 3.7 Special Status Species, Section 3.8 Range Resources, and Section 3.10 Public Health and Safety. The elements of the Reclamation Plan will be developed in detail as part of the Construction, Operation, and Maintenance (COM) Plan.

METHODOLOGY

Information on reclamation issues and recommendations for ensuring successful reclamation was obtained from a review of the Great Basin Restoration Initiative (BLM 1999b); the Burned Area Emergency Rehabilitation (BAER) Plan (BLM 1999a); Nevada Guidelines for Revegetation (Nevada State Clearinghouse 1998); Tuscarora Natural Gas Pipeline Project Draft and Final EIR/EIS (Tuscarora 1994, 1995a); Alturas Intertie Project Construction, Operation, and Maintenance (COM) Plan (SPPC 1998); and 1999 Post-Construction Mitigation Monitoring Report for the Alturas Intertie Project (KEA 2000).

Regulations, Plans, and Guidelines

Regulations, plans, and guidelines that apply to reclamation of disturbed areas resulting from the project, and regional issues affecting reclamation planning, include the Great Basin Restoration Initiative, Burn Area Emergency Rehabilitation (BAER) Plan, and the Nevada Guidelines for Revegetation.

The Great Basin Restoration Initiative

The Great Basin Restoration Initiative (BLM 1999b) began in 1999 in response to major landscape changes taking place in the Great Basin. These landscape changes are attributed to major wildland fires in 1999, invasive weed and annual grass invasions, and deteriorating rangeland and wildlife habitat conditions. There is a growing realization of the enormous economic and ecological consequences of these interconnected landscape changes. In response, the Great Basin Restoration Initiative was created to try to restore functioning native plant communities, stabilize watersheds and soils, improve wildlife habitat, improve rangeland quality for wild horses and livestock, reduce invasive weed and annual grassland invasions, protect areas with high-resource values, improve recreational opportunities, and reduce risks and costs of wildland fires. To meet these objectives, long-term restoration has been proposed to break the cycle of increased annual grass invasions (e.g., cheatgrass) and wildland fires by reducing invasive weeds and annual grasses.

Burn Area Emergency Rehabilitation (BAER) Plan

In response to the devastating wildfire season experienced by Nevada in 1999, the BLM requested the Department of Interior to send a Burned Area Emergency Rehabilitation (BAER) Team to help identify, evaluate, and plan the rehabilitation of critical areas within the fire perimeters. The BAER Team includes resource professionals from federal, state, and local agencies, as well as private enterprises, resource groups, and landowners. The BAER plan (BLM 1999a) for the Northern Nevada Fire Complex covers portions of lands managed by BLM's Elko and Battle Mountain Field Offices. The goal of the plan is to

assess rehabilitation needs and make recommendations with regard to vegetation and range resources, invasive weeds, wild horses, soils and watersheds, wildlife, sensitive species, and cultural resources.

Nevada Guidelines for Revegetation

The Nevada Guidelines for Revegetation (Guidelines)(Nevada State Clearinghouse 1998) represent the combined efforts of numerous State of Nevada agencies and the Nevada Seedbank Coordinating Committee, all of whom are involved in land use, transportation, research, and/or natural resource management activities. The Guidelines assist in the preliminary planning process for projects involving revegetation. The purpose of revegetation, supported by the State of Nevada, is to return the land to conditions and productive uses similar to pre-disturbance conditions, or to a desired site-specific plant community. When revegetation selections or practices less preferred by the State of Nevada are proposed for a particular project, the State of Nevada requests that the reasons supporting such choices be detailed in accompanying environmental documentation. The state requests that impacts to existing native vegetation be minimized, topsoil be stockpiled and replaced, and measures be implemented to avoid weed invasions. The guidelines call for use of native or non-persistent exotic plant species in the revegetation process to help promote the long-term maintenance of Nevada's remaining native vegetation, as well as to improve and restore degraded habitat.

Goals and Objectives

The goals of reclamation for project disturbance areas are to: (1) restore plant communities and associated wildlife and range habitat; (2) restore wetland functionality; (3) prevent substantial increases in invasive, non-native species (invasive weeds), including cheatgrass; (4) prevent project-related soil erosion and sedimentation; and (5) restore the visual character of the project area to pre-construction conditions.

To achieve these goals, the Reclamation Plan includes the following objectives:

- Restore temporarily disturbed upland and wetland plant communities and range and wildlife habitat to species composition and vegetation cover similar to those found in adjacent areas undisturbed by project activities.
- Restore wetland topography and hydrology to support wetland functions similar to pre-construction conditions.
- Restore native plant cover and control cheatgrass and other invasive non-native species in areas highly susceptible to invasion, but as yet not dominated by these species.
- Provide greenstripping in cheatgrass-dominated areas disturbed by project activities where it would aid in protecting resources from future wildfires.
- Incorporate construction and reclamation BMPs and revegetation measures to stabilize soils and prevent increased erosion and sedimentation and other potential soil-related problem areas disturbed by project activities.
- Incorporate non-linear (e.g., sinuous) construction pathways, minimization of vegetation removal, or other visual impact minimization measures where feasible.

Responsibilities

SPPC would be responsible for providing the contractor, reclamation team, and post-reclamation monitors with the final Reclamation Plan. The final Reclamation Plan would be included as part of the COM Plan. It would be the responsibility of SPPC to ensure that the contractor, reclamation team, and post-reclamation monitoring teams understand the intent of the final plan and are committed to meeting the plan objectives. SPPC would supply an environmental compliance monitor to ensure adherence to the plan. In addition, BLM will also supply an environmental compliance monitor.

E.2 RECLAMATION CONSTRAINTS AND RECOMMENDATIONS

SOILS

Soil issues related to reclamation include potential impacts resulting from the seven soil constraint groups listed in Table E-1, all of which could reduce the success of reclamation efforts. Two particularly important soil constraints that may affect reclamation are steep slopes and erosion hazard. Areas affected by these two characteristics are discussed in Section 3.2, Soils. Specific construction and reclamation measures and best management practices (BMPs) would be implemented to minimize disturbances in areas with soil constraints in an effort to ensure successful reclamation. These measures and BMPs are summarized in Table E-1 and outlined in Section E.3, Implementation [Construction and Reclamation Protocols].

TABLE E-1: RECLAMATION ISSUES, CONSTRAINTS, AND APPLICABLE MEASURES

Resource	Issue/Constraint	Applicable Measures
Soils	High water erosion hazard – loss of topsoil and sedimentation of downstream resources	Mitigation Measure Soil-4 Apply erosion and sediment control BMPs during reclamation
	Steep slopes – insufficient water availability to the root zone and difficult to retain seeds on slope	Mitigation Measure Soil-4 Apply erosion control BMPs where needed
	Shallow depth to bedrock – plant rooting depth and available water may be restricted	Mitigation Measure Soil-2 Use prescriptive seed mixes containing native species adapted to these soils
	High water table – deep rutting and compaction from equipment	Mitigation Measure Soil-1
	Course textured soil – poor water retention for seed germination and plant establishment	Mitigation Measure Soil-2 Use prescriptive seed mixes containing native species adapted to these soils
	Salinity/alkalinity – low nutrient availability, potential for stunted plant development	Mitigation Measure Soil-2 Use prescriptive seed mixes containing native species adapted to saline/alkaline conditions.
	High shrink/swell potential – soil stability and drainage problems	Mitigation Measure Soil-1 Mitigation Measure Soil-3 Use prescriptive seed mixes containing native species adapted to these soils
Vegetation Resources; Wildlife and Wildlife Habitat; Special Status Species; Range Resources	Temporary loss and disturbance of upland plant communities, associated wildlife habitats, and range resources.	Mitigation Measure Vegetation-1 Revegetation of plant community types and associated habitat and range resources, using prescriptive seed mixes.
	Temporary loss of riparian and wetland communities.	Mitigation Measures Vegetation-6A-6C Revegetation of riparian and wetland communities and associated habitat using prescriptive seed mixes.
Invasive Weeds	Introduction and dispersal of invasive weeds during any phase of construction, operations, and maintenance	Mitigation Measures Vegetation-4 Mitigation Measure Invasive Weeds-1 Revegetation of native plant community types, but including use of competitive non-native, non-invasive plants (e.g., crested wheatgrass) in prescribed seed mixes in areas that are highly infested or highly susceptible to infestation.
	Potential for increased cheatgrass invasion in project disturbance areas.	Revegetation of native plant community types and greenstripping, including use of competitive non-native, non-invasive plants (e.g., crested wheatgrass) in prescribed seed mixes in fire-prone areas that are highly infested with cheatgrass or highly susceptible to infestation by cheatgrass.

Resource	Issue/Constraint	Applicable Measures
Reclamation	Potential damage to revegetated areas during plant establishment phase by livestock grazing or through public access	Placement of barriers/fencing or other means to temporarily block access and exclude grazing to sensitive revegetation areas, including compensation for grazing exclusion on private lands.

VEGETATION RESOURCES, WILDLIFE AND WILDLIFE HABITAT, AND RANGE RESOURCES

Reclamation issues include restoration of upland, wetland, and riparian plant communities and associated wildlife habitats. Vegetation and associated range and wildlife habitat issues and recommendations are described below and summarized in Table E-1. Revegetation protocols are outlined under Section E.3, Implementation.

Restoration of Upland Plant Communities and Associated Wildlife and Range Habitats

To ensure that wildlife and range habitat values are restored, seed prescriptions would be developed based on the plant species composition, species dominance, and habitat characteristics of the native plant community that would be disturbed by project activities. Plant community types and associated wildlife and range habitats are discussed in Section 3.4, Vegetation Resources; Section 3.6, Wildlife and Wildlife Habitat; and Section 3.8, Range Resources. Seed mixes and revegetation strategies for upland plant communities would be modified based on soil constraints and the likelihood of increased invasion by cheatgrass and spread of invasive weeds. The selection of seed mix prescriptions for plant community types is discussed in Section E.3, Implementation.

Wetlands and Riparian Communities

Special issues or concerns with wetlands and riparian communities include unique soils, hydrophytic vegetation, soil compaction, and hydrologic conditions that could be affected by project activities, thus hindering success in restoring wetlands to pre-construction conditions. Potential impacts to wetlands and riparian areas and the mitigation measures to reduce them are described in Section 3.4, Vegetation Resources. Hydrology, topography, topsoil, and vegetation would be restored during reclamation of wetland and riparian areas temporarily disturbed by construction activities.

Based on post-construction assessment of revegetation activities for the Tuscarora Pipeline Project and Alturas Intertie Project (KEA 2000), high vegetation cover and species richness were reestablished when hydrology and topography were restored following construction. Seed mixes and revegetation strategies for wetland and riparian communities would be modified based on soil constraints and the likelihood of invasion or spread of invasive weeds. The selection of seed mix prescriptions for plant community types is discussed in Section E.3, Implementation.

INVASIVE WEEDS

To prevent the introduction and dispersal of invasive weeds, proper seed mixes and construction, reclamation, and post-reclamation weed management practices will be implemented. Also, revegetation will be implemented as quickly as possible following construction. Invasive weed issues and mitigation measures are described in Section 3.5, Invasive, Non-native Species, and control measures are outlined in Section E-3, Implementation [Weed Abatement Plan]. The goal would be to prevent and minimize population increases or the spread of invasive weeds resulting from this project. Invasive weeds issues and recommendations are summarized later in this plan.

Cheatgrass

The frequency of wildfires in the Great Basin has increased substantially, largely as a result of the invasion by cheatgrass throughout the region. Once cheatgrass dominates an area, it is unlikely to be restored to the natural plant community due to the recurrence of wildfires. Wildfires are a natural component of the Great Basin ecosystem; however, increased wildfires can result in losses of wildlife and range habitat. The goal is to prevent increases in the potential for wildfires resulting from project disturbances and to assist in lowering the potential for wildfires where resources need protection.

To lower the likelihood of wildfires, areas disturbed by project construction which are highly susceptible to cheatgrass invasion would be monitored and treated during the reclamation process. In general, highly susceptible areas include native vegetation communities that have recently burned, those that are near to heavily infested areas, and those that are characterized by soil types (e.g., Tenabo series) which are frequently dominated by cheatgrass. Areas currently dominated by cheatgrass may, in some cases, be revegetated with greenstrips to assist in preventing wildfire spread and enable access for firefighting crews during fires.

E.3 IMPLEMENTATION

To facilitate post-construction reclamation, the contractor would adhere to the following guidelines.

CONSTRUCTION AND RECLAMATION PROTOCOLS

Site Preparation

Site preparation would be implemented by the construction contractor, concurrent with (e.g., topsoil salvage), and subsequent to (e.g., regrading) transmission line construction. Site preparation involves the removal of obstacles (e.g., large rocks, trees, brush) to provide sufficient area for construction activities. Areas cleared of obstacles would not necessarily be subject to grading. Site preparation would be limited to the area required to facilitate access to reclamation areas and implement reclamation. Site preparation would comply with all relevant mitigation measures in the EIS.

Topsoil Salvage, Storage, and Replacement

Topsoil on sites subject to temporary disturbance would be salvaged and replaced after project construction to enhance revegetation. Low shrubs and herbaceous plants would be salvaged along with topsoil to increase organic matter and decrease the potential for wind and water erosion. Topsoil would only be removed from areas that require blading and excavation.

After the transmission line construction corridor has been regraded and any subsoil compaction in the work areas has been alleviated, topsoil would be replaced in those areas from which it was stripped. Topsoil would not be mixed with subsoil or spoil material before or during replacement, and only topsoil and any salvaged organic matter would be respread over the surface.

Recontouring/Regrading

All construction areas would be recontoured to approximate pre-construction grades with allowances for settling.

Treatment of Soil Compaction

Some of the soils within the project area have a high clay content. Compaction would be minimized by implementing Mitigation Measure Soil-1. Areas determined to be compacted (i.e., to a degree which contributes to erosion, or impedes water infiltration or reclamation success) would be treated following

construction. Soil compaction would be avoided by using a chisel, plow, disc, or other equipment. Compacted soils would not be treated if it is determined that the treatment would do more harm than good. Areas to be treated would be determined by a qualified reclamation ecologist and soil specialist.

Erosion Control

Measures to minimize the potential for soil erosion due to project construction activities would be implemented in all project areas. These measures are detailed in Section 3.2, Soils.

Additionally, non-standard construction equipment and techniques (e.g., balloon-tire vehicles, geotextile cushions) that minimize surface disturbance, soil compaction, and topsoil loss would be implemented in areas of highly erodible soils.

The re-establishment of vegetation would be implemented as quickly as possible after construction to reduce the erodibility of soils in these areas.

Rock Disposal

Rocks would be disposed of in a manner that would not interfere with natural drainage patterns or the movement of wildlife or livestock. In rangeland areas, rock would be distributed over the disturbed area after project construction. Rock displaced by grading would be redistributed within the project area as agreed to by the land management agency or landowner or hauled away to an approved rock disposal storage site. Large rocks (boulders) may be placed for use as access control structures.

REVEGETATION PLAN

The project proponent would be responsible for revegetating areas subject to temporary impacts caused by project construction. To meet these reclamation objectives, the Revegetation Plan is designed to promote re-establishment of vegetation similar in composition and species richness to preconstruction conditions.

SPCC's approach to revegetation emphasizes conservation and enhancement of native vegetation, supplemental seeding, and control of invasive weeds and erosion. Disturbed areas to be seeded following construction would be determined by a qualified reclamation ecologist and appropriate resource specialists (i.e., soils, wildlife, visual, weeds) based on site sensitivity (e.g., erodibility, susceptibility to weeds, importance to sensitive wildlife) and low likelihood to restore naturally. SPCC does not intend to transplant or plant container stock.

Seed Collection Program

Native seed would be locally collected for revegetation while ensuring that seed source plant populations would not be adversely affected. Any seed material to be salvaged from areas subject to vegetation removal would be conducted prior to construction activities. BLM uses locally collected seed in their revegetation programs and issues permits and contracts to commercial collectors for seed collection on BLM-managed lands.

Species Selection and Seed Mixes

Descriptions of plant communities mapped during preconstruction field surveys, including plant species composition, are provided in Section 3.4, Vegetation Resources. Seed mixes would be included in the COM Plan, following coordination with BLM and NDOW.

Combinations of the following key elements would guide the development of site-specific species mixes, depending on objectives (e.g., erosion control, wildlife habitat reclamation) and site conditions (e.g., soil type, water availability):

- The distribution and density of native plant species in the plant communities and areas subject to project disturbance;
- Native plant species with high wildlife habitat value;
- Native and non-invasive, non-persistent, non-native plant species which control erosion;
- Plants adapted to additional soil constraints (e.g., high alkalinity, hydric soil);
- Native and non-invasive, non-persistent, non-native plant species which compete with cheatgrass and other invasive weeds;
- Species which enhance natural patterns of plant community re-establishment;
- Plant species likely to become established from seed in disturbed areas (i.e., it is better to use species that are known to have high germination rates and a demonstrated ability to colonize disturbed areas); and
- Availability of commercially and locally collected seeds.

Plant species would be selected using information from the following sources:

- Floristic inventory of plants found in the study area, including those listed in the Vegetation Survey Report (SEI 2000)
- Plant community descriptions (see Section 3.4, Vegetation Resources)
- BLM recommended reclamation seed mixes
- Alturas Intertie Project COM Plan seed mixes (SPPC 1998)
- Valmy to Falcon 345 kV Power Line COM Plan (EDAW 1994)
- Tuscarora Natural Gas Pipeline Project Reclamation Plan (Tuscarora Natural Gas Transmission Company 1995b)
- VegSpec: a multi-agency, web-based decision support system, maintained by NRCS, that assists land managers in the planning and design of vegetative establishment practices, based on specific site information (e.g., soils series) and site objectives. (The web address is: <http://www2.nrcs.usda.gov/Netdynamics/Vegspec/pages/HomeVegspec.htm>)

Seedbed Preparation

On slopes less than 15% where graded areas would be returned to their preconstruction condition, the seedbed would be disced, harrowed, and/or otherwise treated, as needed, to reduce compaction, break up large soil clods, and add texture to the surface to reduce runoff and create microsites for seed germination. Where slopes exceed 15% and in areas with extremely rocky soils, the soil surface would be left in roughened condition to create an irregular seedbed to provide microsites for seed germination and minimize soil movement and runoff.

Sowing Seed

To maximize germination success, seeding would be conducted through a combination of drill and broadcast, appropriate to species planted and site conditions (e.g., grasses and forbs may be drilled or otherwise mixed into soil; sagebrush and other scrub seeds would be broadcast by seed dribbling or other methods). Additional seeding techniques (e.g., hydroseeding) would be used, as needed, in areas with adverse conditions (e.g., wind erosion).

Seeding Schedule

The seeding schedule would be refined in response to weather, site conditions, and the construction schedule. Seeding would be coordinated with other reclamation activities and would occur as soon as possible after final grading, if weather conditions and the season are suitable. Steep slopes and areas adjacent to perennial or intermittent streams would be seeded immediately after final grading (weather permitting) along with erosion control measures detailed in Section 3.2.

SENSITIVE RESOURCES

Wetland and Riparian Communities

Specific revegetation and protection protocols shall be developed and detailed in the COM Plan for wetland and riparian areas. Protocols shall include seed mixes and sowing protocols specific to riparian and wetland communities, as well as specific protocols for post-seeding weed control, access, and grazing. The protocols shall include Mitigation Measures Soil-1, Vegetation-4 and -5, and Invasive, Non-native Species-1.

Prior to construction, riparian and wetland areas that are avoidable would be identified and clearly marked to avoid disturbance. Unavoidable riparian and wetland areas would be documented and photographed as part of pre-construction monitoring.

WEED ABATEMENT PLAN

The Weed Abatement Plan outlines prevention and control measures for invasive weeds which could spread as a result of project activities. Invasive weeds identified during project site surveys included hoary cress (*Cardaria draba*), also known as low whitetop, and tall whitetop (*Lepidium latifolium*), also known as perennial pepperweed. Cheatgrass is also prevalent in the project area and is discussed below. Control measures would also be included for all additional invasive weeds identified prior to or during project construction and reclamation.

SPPC shall control invasive weeds occurring in the project area as a result of project construction until both revegetation and weed abatement criteria have been met. SPPC shall additionally reseed substantial-sized (e.g., greater than 0.5 acre) areas disturbed during operations and maintenance activities which are at risk to weed invasion.

Table E-2 summarizes the ecology and preferred treatment methods and dates for invasive weeds found in the project area during surveys. Site-specific cheatgrass control and revegetation protocols shall be included in the COM Plan for reclamation of highly susceptible areas. All treatments must be approved for use by the landowner and be conducted in compliance with state and local weed control regulations. All herbicides must be applied by qualified, licensed personnel and used in accordance with label directions. To minimize further disturbance, treatments will be conducted in conjunction with weed surveys to the extent possible.

The University of Nevada Cooperative Extension publishes up-to-date information on the identification and control of weeds, and contains accepted treatment protocols for other common invasive weeds that could occur but thus far have not been observed in the study area. These invasive weeds could become problems at some point in the future. Comparative treatment strategies for the control of tall whitetop are detailed in Biology and Control of Perennial Pepperweed (Renz and Di Tomaso 1999).

SPPC would be responsible for the control of invasive weeds occurring in areas disturbed during construction within the 500-foot wide study corridor, around the substations, and along access roads used solely or primarily for project operation and maintenance, until both revegetation and weed

abatement criteria have been met. SPPC would not be responsible for pre-existing weed infestations, weeds introduced by another activity (e.g., other construction project, mining, ranching, hunting, etc.), or natural occurrence (e.g., fire); weeds found beyond the right-of-way; or weeds along existing access roads, which are not improved by the project.

TABLE E-2: ECOLOGY AND CONTROL OF INVASIVE WEEDS*

Weed	Preferred Treatment	Treatment Dates	Monitoring and Retreatment Dates
Hoary Cress	Apply a site-appropriate herbicide (i.e., in accordance with label) during early growth to “broccoli head” stage (Donaldson and Bowers 1998). Follow by planting of competitive vegetation following completion of construction activities. Repeated cultivation may be used in areas with low erosion risk away from water channels (Donaldson and Bowers 1998).	Late winter to early spring, based on growth stage. Cultivate every 21 days beginning in early spring, until no additional seedlings appear.	Monitor 21 days following treatment. Mow or cut any growing plants, especially if flowers are present. Every 21 days until weed abatement criteria are met (see Section E-4 [Weed Monitoring Plan]).
Tall Whitetop/ Perennial Pepperweed	Mow or cut when flowers reach the bud stage. Follow with a site-appropriate herbicide (i.e., in accordance with label) one month later (Renz and Di Tomaso 1999). Cover treated site with straw or other barrier, if possible, to prevent seed spread. Follow with competitive vegetation following completion of construction activities.	Mow late spring to early summer when flowers are in bud stage. Herbicide one month later.	Monitor one month following complete treatment. Repeat treatment in following year, if needed, using spot treatments to avoid injury to any planted vegetation.

* Invasive weed infestations to be controlled include those that cannot be avoided during construction activities. See the following paragraph for information on control of cheatgrass.

Cheatgrass

Site-specific cheatgrass control and revegetation protocols shall be included in the COM Plan for reclamation of highly susceptible areas (i.e., native plant communities which recently burned, are near dense cheatgrass infestations, or are on soil types which are often dominated by cheatgrass), and cheatgrass-dominated areas to be selected for greenstripping. The prescribed seed mixes for greenstrips and areas highly susceptible to cheatgrass invasion would include, where necessary, the use of competitive non-native, non-invasive plants (e.g., crested wheatgrass) to compete with cheatgrass. Greenstrip locations would not be placed in all cheatgrass-infested areas. They would be chosen based on the likelihood of effectively suppressing fires and protecting resources from future wildfires and cheatgrass infestations. Areas proposed for greenstripping would be determined in cooperation with BLM, NDOW, and the Nevada Department of Forestry.

See Section E-4 for details on weed monitoring and Mitigation Measure Invasive Weeds-1i for details on abatement success criteria and weed monitoring.

RECLAMATION MANAGEMENT

Grazing

Livestock would be temporarily removed from work areas during transmission line construction as needed to avoid interference with construction activities. Additionally, modification of livestock grazing practices may be required to facilitate post-construction reclamation, soil stabilization, and revegetation of areas disturbed by the project. Grazing modifications may be required in areas of habitually high livestock concentration and/or sensitive sites (e.g., erodible soils, wetlands).

Grazing by livestock and/or wild horses has the potential to retard or preclude revegetation of areas disturbed by the project. In sensitive areas, such as wetlands or where livestock concentrate, grazing impacts, if not modified, could prevent reclamation of plant communities disturbed by the project. Areas with reclamation problems resulting from grazing would be protected by management methods feasible for the site. Such methods may include temporary fencing around the site, shifting livestock to other areas, or other methods. Sensitive areas would be protected to the extent feasible where reclamation problems are anticipated, along with unanticipated problem areas that may need remedial reclamation work due to grazing impacts.

Prior to construction, SPPC would work with public agency personnel, allotment permittees, and private livestock operators to identify any authorized range improvements crossed by the project. Alternative water sources would be made available during the period of disruption by project operations if deemed necessary by the responsible public agency or the private landowner. If required, compensation (e.g., based on losses of Animal Unit Months - AUMs) would be provided to private landowners for temporary grazing exclusions that result in grazing losses. SPPC would ensure that construction-affected public and private land range improvements are protected or repaired.

Fencing and Access Control

Livestock and wildlife management fencing would be protected and/or reconstructed in consultation with the managing agency or private landowner. Existing barriers (i.e., fences and gates) to vehicle travel would be maintained during construction and new barriers would be placed to block access areas. Reclaimed access roads and routes would be monitored during post-construction monitoring of areas disturbed by construction. Efforts to control unauthorized use of the ROW would be coordinated with land management agencies and landowners and would be conducted during post construction reclamation monitoring. Methods to control such use may include the following:

- Installation of gates (with or without locks) with fencing extending a reasonable distance to prevent bypassing the gate, especially where fences can be extended to a natural barrier such as an impassable draw or rock outcrop.
- Placing rocks (boulders) at selected sites to inhibit unauthorized vehicle access.
- Installation of slash and timber, pipe, or rock barriers to limit unauthorized access.
- Posting of signs at points of access along the ROW.

E.4 RESTORATION SUCCESS CRITERIA, MONITORING, AND REMEDIATION

RESTORATION SUCCESS CRITERIA

Restoration success criteria are defined as factors to evaluate the success of the reclamation goals and objectives. Criteria to evaluate post-construction revegetation, effectiveness of erosion control measures, and control of cheatgrass and other invasive weeds are outlined in this plan and would be included in more detail in the COM Plan.

Erosion

The effectiveness of erosion control measures would be evaluated by noting particular site conditions, including soil movement and downslope sedimentation, surface litter movement, flow pattern development, rills and gullies, wind-scour depressions, and plant root system exposure.

If the conditions listed are present, it would be assumed that project-related erosion is occurring, and options for remedial measures would be evaluated and implemented as needed. Details on appropriate

erosion control measures are outlined in Section 3.2, Soils and will be presented in more detail in the COM Plan. Erosion control measures would be considered successful when no project-related erosion is evident 5 years following project implementation and when revegetation is considered successful.

Revegetation of Plant Communities and Associated Range and Wildlife Habitat

Revegetation success would be evaluated by comparing project-affected sites with pre-construction conditions and/or adjacent areas in terms of species composition and vegetation cover. The revegetation of sites would be considered successful if they are within a specified percentage of the mean native species composition and vegetation cover of the reference site(s). The reference sites would be either the project-affected site as recorded during pre-construction conditions (if known) or representative areas which have the same target plant community adjacent to the affected site. Preliminary success criteria for species composition are 80% or higher of the mean number and type of native species as in the reference sites and 50% or higher of the vegetation cover of the reference sites, 5 years after implementation of reclamation actions. Wetland areas would have an additional criterion: at least 50% of the vegetation cover should consist of wetland indicator species (i.e., those with a wetland indicator status of OBL, FACW, or FAC (excluding FAC-) as indicated on the national wetland plant list (Reed 1988).

In addition to success criteria, revegetation performance would be evaluated in each year following seeding to ensure successful germination and survival of seedlings. The yearly weather pattern in the Great Basin is unpredictable, and conditions in any given year are often poor for germination. It may take as many as 3 years of seeding to ensure successful germination in some areas. Germination success depends partly on which species are seeded. Criteria for germination success would be included in the COM Plan.

Invasive Weeds

Weed management would be considered successful if existing invasive weed infestations in areas disturbed by construction were no greater in density and extent one year following construction than they were when last monitored prior to construction, and when revegetation criteria were met. SPPC would not be responsible for controlling infestations without a true cooperative effort by surrounding land owners.

In areas where cheatgrass control is required, successful control would be evaluated along with revegetation success. Control would be considered successful when cheatgrass cover is within the range of cheatgrass cover in reference sites (see Revegetation, above) and revegetation criteria were met. Greenstripped areas within sites already heavily infested with cheatgrass would not be required to meet success criteria unless they were used to protect sensitive wildlife or other resources as a required mitigation measure.

Wetlands and Waters of the U.S.

Wetland reclamation would be considered successful if wetland topography and hydrology were within the range of conditions (e.g., gradient, soil profile, surface flow and infiltration patterns) exhibited in reference sites (see Revegetation above), so as to support wetland functions similar to pre-construction conditions.

MONITORING

Monitoring would consist of both qualitative and quantitative analyses. Monitoring would be conducted annually beginning just prior to construction, to establish baseline conditions in sensitive areas (e.g., wetlands). Post-construction monitoring would continue following reclamation until success criteria were met. If post-construction monitoring results indicated that project-affected sites were trending toward successfully meeting soil, vegetation, invasive weeds, and other criteria, monitoring may be

conducted less frequently (e.g., every 2 or 3 years) subsequently, until success criteria were met. Objectives of monitoring may include the following:

- Qualitatively describe the status of revegetation in areas disturbed by the project.
- Qualitatively survey areas disturbed to identify and remedy areas experiencing revegetation failure.
- Document and map areas where revegetation is not progressing in a desired direction, assess the severity of the problems.
- Quantitatively sample and evaluate representative reclamation areas and reference sites (see Revegetation above) to determine whether or not success criteria are met or whether remedial measures are necessary.

Weed Monitoring Plan

Monitoring of invasive weed populations would be conducted annually until both revegetation and weed abatement success criteria have been met. Weed surveys may be conducted less frequently (e.g., every 2 or 3 years) if survey results indicate weed abatement criteria are met, and will continue until revegetation criteria have been met. The monitoring would be conducted during the growing season for most weeds, between late May and mid-July. Lists of weeds to be included in the invasive weed survey would be obtained from the BLM Field Offices and the Nevada Cooperative Extension. Additional information on invasive weed species' habitat requirements, blooming periods, and field identifying characteristics may be obtained from information provided by the Nevada Cooperative Extension, Integrated Pest Management Office, and other references, including *Invasive Plants in Nevada: An Identification Handbook* (Stoddard et al. 1992), *Weeds of the West* (Whitson 1992), *Weed Identification and Control Guide* (Donaldson and Bowers 1998), *Noxious Weeds of Central Nevada* (BLM 1999), *The Grower's Weed Identification Handbook* (University of California Undated), and *The Jepson Manual* (Hickman 1993).

New hoary cress infestations, if any, would be visible in late winter to early spring and would be expected to spread to moist areas (e.g., moist meadows, roadside ditches) and waterways (e.g., ditch banks) in the project area. New cheatgrass infestations would be visible in spring through early summer and would be expected to spread to highly susceptible sites as described in Section E.2 (Invasive Weeds). Tall whitetop infestations would be visible in late winter through summer and would be expected to spread to moist areas similar to hoary cress.

Surveys would be conducted in areas disturbed during construction on foot and/or by vehicle within the 500-foot study corridor, along spur roads and improved and/or reclaimed access roads, and material yard and staging areas. Species names and locations of weed infestations would be mapped (e.g., on USGS 7.5-minute quadrangle maps, or aerial photographs, and/or using a global positioning system [GPS]) and transferred to an updateable GIS database. Photographs would be taken of treated populations prior to treatments and one year following treatments. Infestations would be included on the maps at the following levels:

- Satellite Populations (i.e., possible new colonies) - Defined as very small infestation areas (less than 25 square feet) which have only a few individual plants and are found apart from dense or large weed populations.
- Infestation Sites – Defined as a site in which a minimum of 25 square feet is populated by a weed species. Densities of these weed populations would be estimated as high (i.e., >50 plants), medium (i.e., 10-50 plants), or low (i.e., <10 plants), based on the average number of plants per 25 square feet. Densities can be defined differently for different weed species, as appropriate. All density definitions should be provided on the field monitoring sheets.

REMEDIATION AND ADAPTIVE MANAGEMENT PROCESS

If evaluation of monitoring results indicates that sites disturbed through project activities have not met, or are not trending toward meeting, reclamation criteria, the erosion control, revegetation, or invasive weed control plans may need to be revised (e.g., schedule, seed mixes, treatments, preparation methods). Remedial measures would be implemented as soon as practicable in any problem site identified during monitoring. Remedial measures would be selected on a case-by-case basis and may include measures such as supplemental seeding, mulching, additional weed control measures, use of matting, or other erosion control measures. Remedial measures would be subject to agency approval.

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